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formerly thought to be absorbed or taken into the plant through the leaves. . . . It is now thought that even the air must furnish its food to plants through the roots."—H. HASSELBRING.

Biology of plants.

ONE OF THE first to appreciate the modern ecological view-point was Professor Wiesner, who issued his classical *Biologie der Pflanzen* in 1889. A second edition of this work has appeared⁴ in which no radical change of treatment is to be seen. Throughout the new edition, however, the contributions of the past decade are found intercalated in their proper places. In the introduction there is a fuller setting forth of vitalism and mechanism. Among the topics which are added or much changed are polarity, light and rain adaptations, photometry (the author's own work). The chapter on evolution is also much changed, and the last part is largely new. The order of the chapters is as follows: SECTION I, Biology of the vegetative processes: the individual; survey of the plant forms according to their mode of life (biological types); primordia, development, form and direction of organs; polarity, correlations, and leaf position; complications in determining the causes of organic forms; rhythm of the vegetative processes; germination of seeds and buds; vegetative growth; flowering and fruiting; rest periods and leaf-fall; adaptation of plants to external vegetative conditions; adaptation of plants to other organisms; specific adaptations, reproduction; life duration; vitality. SECTION II, Biological relations of reproduction; distribution of sexual organs; wind-pollinated plants; insect pollinated plants; other aids to pollination, and transitions from one form to another; reciprocal pollination; adaptations for self-pollination; protective adaptations of flowers; apogamy. SECTION III, Distribution of plants; fundamental principles and problems; vegetation forms and formations; distribution areas of species, genera and families; principles of systematic phytogeography. SECTION IV, Development of the plant world (theory of descent). APPENDIX: Historical development of botany. Thus one may see how thorough and comprehensive is this admirable treatise on plant biology, or, as we would say, ecology.—H. C. COWLES.

Plant geography.

THE SIXTH volume of the invaluable series, *Vegetation der Erde*, is by Drude himself and embraces much of the material which he has been gathering for years in his own home-land of Saxony.⁵ Just as Graebner's work on

⁴ WIESNER, JULIUS, *Biologie der Pflanzen*, mit einem Anhang: die historische Entwicklung der Botanik. Zweite, vermehrte und verbesserte Auflage. 8vo. pp. viii + 340. *figs.* 78 and 1 *map.* Vienna: Alfred Hölder. 1902.

⁵ DRUDE, O., *Der Hercynische Florenbezirk*. 8vo. pp. xix + 671. *pls.* 5. *figs.* 16. 1 *map.* Leipzig; Wilhelm Engelmann. 1902. *M*30, bound *M*31.50; to subscribers *M*20-21.50.

the heath⁶ was the first of an ecological series on the formations of central Europe, so Drude's contribution is the first of a floristic series in the same region. The most striking feature of the present volume is its marvelous detail. Exact facts are presented as to the distribution of all of the higher plants, and many of the lower plants. An opportunity is thus given for drawing conclusions as to distribution with almost mathematical certainty. After the usual presentation of historical and geological data, a detailed account is made of the thirty formations of the Hercynic region, placed in ten groups. The body of the work is taken up with a minute discussion of the fifteen subdivisions, into which Drude splits this area. It is here that the individuality and value of this work is best realized; one may well admire the spirit which has prompted the years of exact and careful study making such a volume possible. The closing section treats the relation between the Hercynic and neighboring floras, and the glacial and postglacial history of the Hercynic flora. Not only an abundance of glacial relicts but some interglacial relicts are reported. While the book is scarcely one to be read by one who is unfamiliar with the region, it must be of unspeakable value to German plant geographers. Moreover, all will welcome a volume upon which so much care and pains have been taken to secure an accurate presentation of floristic data.—H. C. COWLES.

MINOR NOTICES.

THREE ADDITIONAL NUMBERS of Karsten and Schenck's *Vegetationsbilder*⁷ have recently appeared. Schenck has prepared the third number, dealing with economic plants from the tropics: *Thea*, *Theobroma*, *Coffea*, *Myristica*, and *Carica*. The fourth number by Karsten portrays the tropical and subtropical rainy forests of Mexico. The fifth number is issued by Schenck, and consists of pictures from southwestern Africa; a desert with *Welwitschia*, a euphorbia steppe, a shrub steppe, *Aloe dichotoma*, acacias along a dry stream bed, *Euclea*. As stated in the former review,⁸ these illustrations are accompanied by full descriptions, and set forth most admirably the vegetation features of far distant lands.—H. C. COWLES.

NOTES FOR STUDENTS.

PAMPALONI⁹ records two species of fungi from the middle Miocene of Sicily, referring them to the genera *Uncinulites* and *Erysiphites*. They are reconsidered by Salmon,¹⁰ the well known authority on these plants, who considers that *Erysiphites* is not related to the modern Erysiphaceae and that *Uncinulites* should be considered as a species of *Cercosporites*.—E. W. BERRY.

⁶ See BOT. GAZ. 35: 293. 1903.

⁷ KARSTEN, G., and SCHENCK, H., *Vegetationsbilder*. Hefts 3, 4, 5. pls. 13-30. Jena: Gustav Fischer. 1903.

⁸ BOT. GAZ. 35: 294. 1903.

⁹ PAMPALONI, L., *Rendiconti della R. Accad. dei Lincei* 11: 250-251. 1902.

¹⁰ SALMON, E. S., *Journ. Botany* 41: 127-130. 1903.